NOTES ON ANCIENT BRITISH MONUMENTS.

I.

SINCE the publication of my book "Stonehenge" some months ago I have received so much valuable information, so many suggestions and promises of work, that I feel it will be convenient if I refer to some of the points which have been thus raised. They refer to many sides of the inquiry, and indicate how very many questions susceptible of local study are raised by the idea of the possible astronomical use of the monuments.

It is only right, however, that I should state *in limine* that the reviews of the book have been almost entirely condemnatory. I am consoled, however, by the fact that there is evidence that the volume had not been read, and that the reviewers have taken so little trouble to inform themselves that they confound the changes brought about in the places of stars by the precession of the equinoxes with those produced in the case of the sun in consequence of the gradual lessening of the obliquity of the ecliptic.

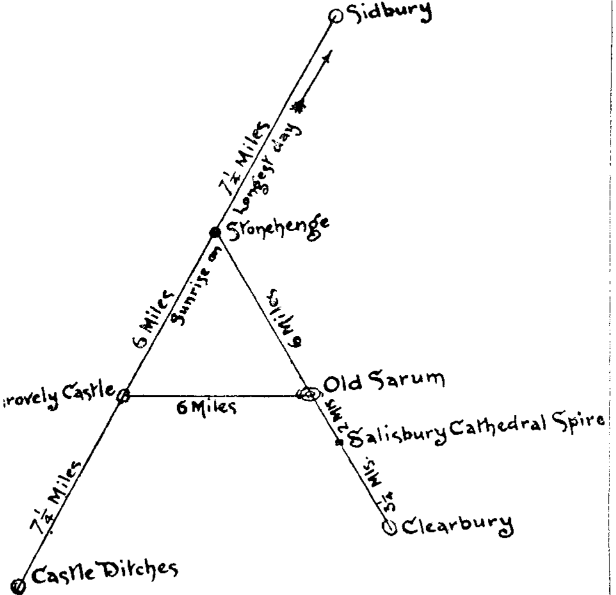

FIG. 1.

Ignoring all the new observations the statement of which was the object of the book, they condemn what they are pleased to call my *theory*, as if a theory were anything but an attempt—even if only a feeble one—to group facts together so that they may be properly understood, and rigid tests applied to it by further work. It is a supreme satisfaction to me to know that further work is going on. Societies for the "Astronomical Study of Ancient Monuments" have been started in Cornwall and Wales, and local inquiries of great value are being made. I am glad to say that these efforts are being sympathetically aided by the existing archæological societies, which, I think, have much to gain by the constant companionship of the spade and theodolite. I also have spent some holiday time in Cornwall, Wales, and Aberdeenshire, adding a special study of cromlechs to the inquiry. What I have previously written concerning the May-year is greatly strengthened by the fact that most of the cromlechs I have examined were constructed so that the sunrise in May or November could be watched from the priests' quarters inside the cromlech through the narrow opening necessary for their protection. I shall give the details of these observations later.

The Inter-relation of Monuments.

In my "Notes on Stonehenge" (NATURE, vol. lxxi., p. 391) I referred to some remarkable relations between Stonehenge and the surrounding localities which had been communicated to me by Colonel Johnston, the late director-general of the Ordnance Survey. These are rendered manifest by the accompanying diagrams which I reproduce.

Fig. 1 shows that Stonehenge is (1) on the same straight line which contains Sidbury, Grovely Castle and Castle Ditches; (2) at the apex of an equilateral triangle of *exactly six miles in the side*; (3) that Salisbury, *i.e.* *Solis*bury Cathedral, from its name an old solar temple, was on the same straight line which contained Stonehenge and Old Sarum.

Fig. 2 shows that the oldest cross-roads on Salisbury Plain exactly occupy the centre of the triangle referred to.

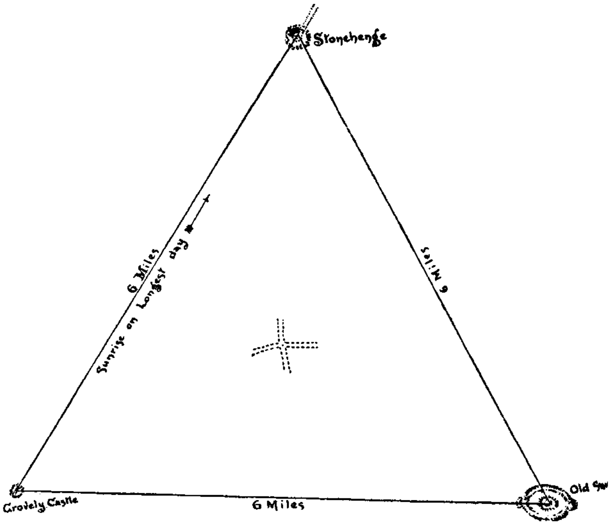

FIG. 2.

Such relations as the above, but on a smaller scale, are often to be noticed, in some cases between monuments, in others between monuments and decided natural features on the sky line as seen from them. I give some examples from Cornwall.

At Trevethy is one of the most famous cromlechs in that county, and it has not been *restored*, so that we need not hesitate to measure it to try to determine its meaning. Close by, at St. Cleer, is a renowned holy well, and a little further away King Doniert's stone.

The accompanying photographic reduction of the Ordnance map shows the strict relation of these monuments. The entrance of the cromlech is directed towards the November sunrise, az. S. 63° E.; looking in the opposite direction it commands the May sunset. I shall refer to this later. As seen from the holy well the cromlech marks the azimuth of the May sunrise. The monolith, King Doniert's stone, is true west from the cromlech, and so marks the equinoctial sunsets.

In the Bodmin district are two famous circles, the Stripple stones and Trippet stones, some half-mile apart.

The following table shows the relation of the latter to the former, and also to the surrounding hill-tops, as I believe was first noticed by Mr. A. L. Lewis.

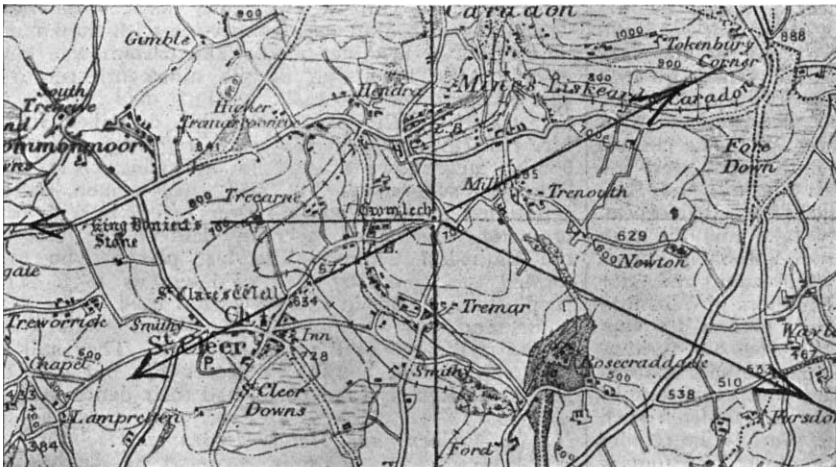

Fig. 3.—The inter-relation of the monuments near Liskeard.

We indeed learn why the circle was erected on the precise spot it occupies.

Trippet Stones, Blisland, lat. 50° 33′ *N.*

	Az.	Hill	Dec.	Star	Date
To Stripple Stones.	N. 81° 30′ E.	2°	N. 6° 42′	Pleiades	1720 B.C.
,, Rough Tor ...	N. 15° E.	1½°	N. 39° 1′	Arcturus	1700 B.C.
,, Brown Willy ...	N. 31° E.	1½°	N. 34° 5′	Capella	1420 B.C.
,, Hawks Tor ...	N. 63° E.	2½°	N. 18° 34′	May Sun	May 14.
,, Barrow	S. 63° E.	1½° assumed	S. 19° 31′	Nov. Sun	Nov. 21.

My wife and I visited the Trippet stones in April, 1907, in the company of Mr. Horton Bolitho and Mr. Collings. A hail-storm made observations difficult, and this may explain the departure of the May and November days from the normal. The coincidence of the dates of the possible observations of Arcturus and Capella suggests that we have then the true date of the erecting of the circle, Brown Willy being subsequently used with Capella when the old alignment of Arcturus on Rough Tor became useless in consequence of the precessional movement.

I shall have more to say on the inter-relation of monuments and double and multiple circles on a future occasion.

Ancient Connection between Stonehenge and Grovely.

Figs. 1 and 2 suffice to show the old association between Stonehenge and Grovely. Canon Wordsworth, in a paper on "Grovely Customs," communicated to the annual meeting of the Wiltshire Archæological Society held in July, 1906, at Wilton, has brought together some additional particulars touching this association.

Some of the new information refers to the gathering of wood in the valleys near Stonehenge; this, I think, may be accepted as strengthening the evidence that the plain at Stonehenge was not wooded, contrary to the opinions of many that the monument was built in a sacred grove of oaks. My argument against this view was that if the monuments had any astronomical use at Stonehenge, Dartmoor, or elsewhere, they would not have been erected among trees, which would have spoiled the observations which were always made on the horizon.

Next, in support of my view that Stonehenge was initially a May-year temple, the celebrations referred to by Canon Wordsworth occur in May. He recalled an extract from a paper written by Mr. J. N. Powell, on "South Wilts in Romano-British Times," in which the writer approached the subject from the point of view of the folklorist and student of primitive religion. Mr. Powell said:—"At Wishford an oak bush is cut annually, formerly at Whitsuntide, but since the Restoration on May 29, and hauled down into the village. It is then decked with ribbons and hung from the church tower, and the day is kept as a revel." Canon Wordsworth said that, if he rightly understood his drift, he supposed that that symbol of the villagers' right to gather wood, and in olden times also to pasture cattle in Grovely Forest, was associated with, or found its expression in, a ceremony of prehistoric cult or nature-worship. He then read a number of extracts from documents lent by the Rector of Wishford, the Rev. F. W. Macdonald, amongst which were the following:—"The aforesaid lords, freeholders and tenants of Barford St. Martin, have had, or should time out of mind have, yearly brought unto them against every Whit Sunday by the Ranger or his assigns, one fat Buck, the one half to

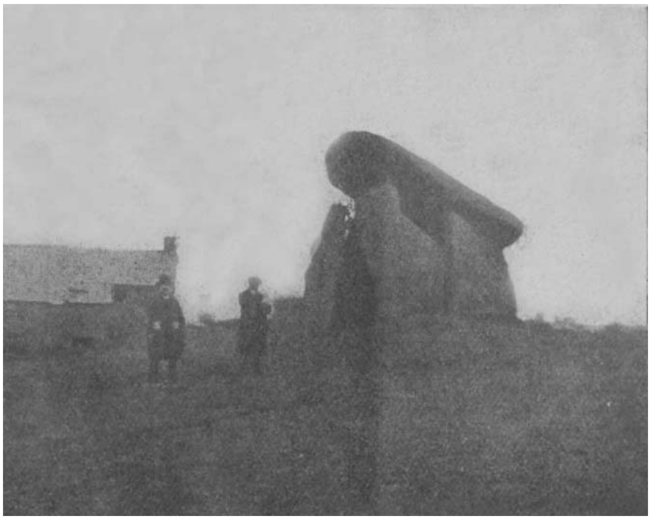

Fig. 4.—The Trevethy Cromlech.

Wishford and the other to Barford, to make merry withal amongst the neighbours. And the Ranger is to have from each of the Manors of Wishford and Barford one white loaf and one gallon of beer and a pair of gloves, or twelve pence in money for the whole, and if the Ranger do not bring nor send the fat Buck then the inhabitants of any of the said Manors or any of them, after that day may go into the said forest and kill and bring away a Buck for each of the said parishes at their pleasure, and then the Ranger is not to have anything." "The custom is and ever time out of mind hath been, that the lords and freeholders of Wishford Magna, and Barford St. Martin, and their tenants, by themselves, their servants and assigns, may take and fetch in the woods of Grovely, speeke rods (probably spicks or spars for use in thatching) and breeding rods, for their houses standing in the said manors of Wishford and Barford, and also fould shoars (stakes for supporting hurdles) and wreethrs (long rods for turning into hurdles) to be employed within the said manors at all times without controulment, and every one of the said lords and tenants that do use to fetch such ought to give the Ranger one hen yearly if he require and send for the same." "The ancient custom is that at all Courts holden for Grovely the Jury and Homage for the said forest hath ever been made, and in Right ought still to be made, of the freeholders, tenants, or inhabitants of Wishford Magna, or Barford St. Martin aforesaid and of none other."

Among the entries in the Rector's book is the following:—"Whereas the lord of the manor and parishioners of the parish of Wishford aforesaid did time immemorial use and enjoy laudable custom yearly in the month of May to cut down and carry away boughs of trees growing in the Chase of Grovely in the said county of Wilts (being part of the estate of the Earls of Pembroke) therewith to adorne the said Church of Wishford, and whereas the right honourable Philip, late Earl of Pembroke (probably seventh Earl, 1647–83), finding that the said usage and entry on the said Chase in the said month of May was a prejudice to his deer in that Chase, it being about fawning time, Did come to an agreement with the said Richard Howe, lord of the said manor of Wishford, and the parishioners of the said parish, and did grant to the said parishioners an annual rent charge in fee simple of six pounds a year issuing out of a meadow called Burdenball Meadow in the parish of Wilton in the said county of Wilts. And whereas the said rent of six pounds has been much in arrear and the right honourable Thomas, now Earl of Pembroke (Thomas Herbert, 8th Earl of Pembroke 1683–1733, Lord High Admiral 1702–1708, Lieut. of Ireland 1707), hath agreed with the said lord of the said manor and parishioners to give them the sum of 260*l.* of lawful money of Great Britain, in case they would release their right of the said rent of six pounds of the arrears."

Here we see how dates are changed, and we get a new reason for the abolition of an ancient custom. But this is not all. There is a suggestion of the old stone worship at Salisbury, the spire of which, as we have seen, is exactly in the line Stonehenge-Old Sarum prolonged.

"The lords, freeholders, tenants and inhabitants of the Manor of Great Wishford, or so many of them as would, in ancient time have used to go in a dance to the Cathedral Church of our Blessed Lady in the city of New Sarum on Whit-Tuesday in the said County of Wilts and there made their Claim to their custom in the forest of Grovely in these words, 'Grovely! Grovely!! and All Grovely!!!'" With reference to the last extract, Canon Wordsworth remarked that the dance to the Mother Church of Salisbury might have been connected with the procession to pay chimney-money, "smoke-farthings," or Pentecostal oblations. But after the Restoration of Church and King in 1660 the date was changed to May 29 in connection with the annual thanksgiving then instituted. The custom was kept up until the beginning of the nineteenth century. The last survivor who took part in it died in 1891, in her eighty-eighth year, and she described it to Mr. Hill (the rector in 1885) as a regular revel, with booths and shows erected in the Close. It was therefore suppressed, but still two women, as a deputation from the bough-bearers, went in with oak branches, which they reverently laid on the altar of the Cathedral Church. The last person who performed this ceremony died so lately as 1853. The people taking part in the procession used to dress in white, and they assembled first at Townsend's Tree, at the south end of the village street. They still in 1885 carried oak boughs in procession, but only as far as the Rectory, and performed their dance there.

Cheap and Handy Instruments.

Undoubtedly for final observations at any monument a theodolite must be employed, using the sun or Polaris in order to avoid all magnetic difficulties, and reversing the telescope to secure the correct altitude of the horizon.

But for rapid surveys there are many handy forms of instrument by means of which preliminary information can be gathered, both with regard to azimuth and, what is equally important, the angular height of the horizon. In a reconnaissance lately among the Aberdeen circles I employed a clino-compass of Barker's pattern; this weighs only a few ounces and is carried in a sling over the shoulders; even a tripod can be dispensed with, though it is much better to have one; the lightest form is that used by the Kodak Company for their cameras. In the clino-compass, as the name implies, both azimuths and altitudes are measured by the same instrument, the level being replaced by a pendulum; in this form, especially in the case of the altitudes, the mean of several observations should be taken. In my opinion, a desideratum for such work is a simple small instrument with level and reversible telescope for small altitudes only—a miniature dumpy level, fitting on to the same tripod which carries the azimuth compass.

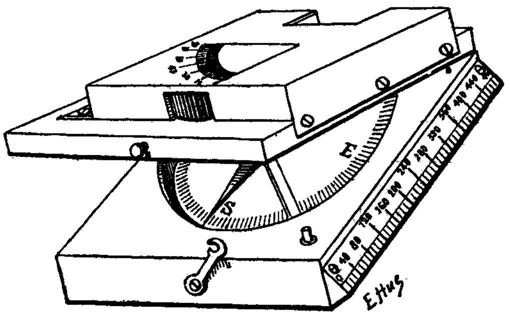

FIG. 5.—M. Hue's combined compass and clinometer.

We learn from the "Manual of Prehistoric Researches" published by the Société préhistorique de France that the French archæologists are much more thorough and philosophical in their inquiries than their British brethren. It is not a question of the spade *versus* the theodolite, but of the spade *and* the theodolite, and as full instructions are given about one as about the other.

It is quite refreshing to read the chapter "Indications pour faire un levé de Terrain à la Boussole," and then the instructions given relating to subsequent work with the large-scale maps published by the French Government.

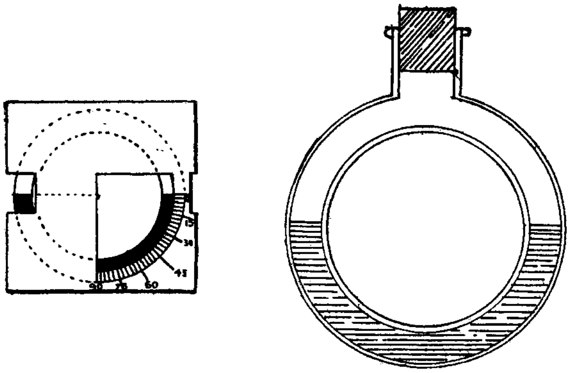

Fig. 6.—Details of the water-level clinometer.

For the angular measurement of elevation, including, therefore, the angular height of the horizon as seen from any monument, the archæologist is recommended to use a very simple and convenient addition to the compass devised by M. Hue. The method employed can be readily gathered from the accompanying woodcuts, obligingly sent to me by the publishers of the "Manual."

It would be a good thing if some one of our many archæological societies would prepare an edition of this excellent French manual for the use of British workers.

Norman Lockyer.

PLAGUE AND FLEAS.

It is a matter of dispute as to where in ancient literature the first definite mention of rats and plague is to be found, and where such mention does occur it is again uncertain what the author intended to convey. It can hardly be doubted, however, that Avicenna, who flourished about the year 1000, clearly refers to this relationship when he says, "Et de eis quae significant illud (the approach of plague) est ut videas mures et animalia quae habitant sub terra fugere ad superficiem terrae et 'pate sedar" id est commoveri hinc inde sicut ebria."

It is noteworthy, however, that Avicenna does not state that the rats died. Passing over many other records of more or less definiteness we come to the important statement of the Byzantine historian Nicephorus Gregoras, who wrote of the plague in Constantinople in 1347, "Nec vero homines solos morbus ille usque flagellabat; sed et si quae alia animalia cum hominibus plerumque degerent et habitarent; canes inquam et equos et cujusque modi avium genera; ipsos etiam mures, si qui forte in domorum parietibus latitabant." Orraeus also, in the plague of Moscow in 1771, mentions rats, but no special stress is laid on the fact, and other animals, as by many other authors, are included. He says, "De avibus a plurimis narrabatur quod minores cantatrices caveis detentae in domibus infectis emorerentur, immo quod mures et glires quantumvis antea copiosi disparuerint; sed de his fides apud relatores esto."

In modern times the death of rats during or before epidemics of human plague was first noticed in India, viz. in Kumaon, 1833–35, by Gowan, in the Pali plague; 1836–8, by Forbes White; and in Kumaon, 1853, by Francis and Planck. Renny states that during the epidemic of 1851 in Kumaon, in two huts occupied by sixteen men (twelve of whom died of plague) a large number of dead rats was found, but that the cattle, thirty in number, escaped. Rocher, in 1878, in Gun-nam, Baker and Lovry in China, state that the rats were first attacked. Yersin, studying the great epidemic of 1894 in China, states that the rats found dead contained the plague bacillus in abundance, and many of them presented true buboes. Many other observations of a similar kind might be quoted. Not always, however, is the relationship manifest, for Hankin states that despite the most careful inquiries no evidence could be obtained of the existence of an outbreak among rats during or after the outbreak among human beings in Hurdwar. Nor, again, in the epidemic of Glasgow could the relationship be established, though it was proved in the outbreak in 1901–2. Further research will show whether these exceptions are real, or due to insufficient observation.

Not only rats, but other animals have in recent years been found to suffer from plague. Thus there exists in Mongolia a peculiar form of plague known as tarbagan plague. The tarbagan is a marmot-like rodent (*Artomys bobac*).

Almost every year an epidemic disease breaks out among these marmots, and a marmot that is affected always dies. The natives of the Baikal districts avoid handling any animal that has axillary and inguinal buboes, though dogs and wolves are said to eat them with impunity. In the skinning and handling of these marmots the peasants contract the disease, and epidemics of this origin are reported throughout the whole of the east Asiatic plateau of Siberia and Mongolia to Tibet. The disease is almost undoubtedly plague, though bacteriological proof is not yet forthcoming.

It has been noted, further, that palm squirrels (*Sciurus palmarum*) die of plague in great numbers in certain parts of India. Further, among the Carnivora, dogs and cats may develop plague. In certain parts of India cats have been found in abundance with suppurating buboes in the neck, the position of the bubo, it is interesting to note, suggesting its origin in ingested food (rats). Finally, monkeys have died of plague in several places in India.

Rats and Fleas.—Ogata, in 1897, succeeded in giving a mouse plague by means of bacilli got from fleas taken from rats dead of plague. Simond, in 1898, attributed the infection of man to the fleas which had left the bodies of rats dead from plague.

"It is usually in the morning that the carcass of a rat which has died in the night is fatal to him who touches it. We were unable to discover a single case of a rat whose death had occurred twenty-four hours previously having communicated the plague. Simond also made the following experiment. He placed twenty fleas (obtained from a cat) in a bell jar, with a rat dying of plague. He then placed a healthy rat in a cage into the bell jar, but also allowed the cadaver of the first rat to remain thirty-six hours in the vessel. The second rat died on the fifth day of plague. The experiment was repeated, but not always with success" (Quoted from Nuttall, "Insects, Arachnids, and Myriapods as Carriers of Bacterial and Parasitic Diseases," pp. 9–20).

Simond believed that infection from man to man takes places, but in an insignificant number of cases as compared to those where fleas carry the infection from rat to man. He regards rats as the main cause in the spread of plague among human subjects.

Loir affirmed that the fleas of rats are the main